

PATENT

CERTIFICATE OF MAILING OR ELECTRONIC TRANSMISSION UNDER 37 CFR 1.8(a)

I hereby certify that this paper (along with any paper referred to as being attached or enclosed) is
_____ being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Commissioner for Patents address below.

X being transmitted via EFS or facsimile to (571) 273-8300 (Centralized Facsimile Number) at the U.S. Patent and Trademark Office.

/Claudia Bader/
Claudia Bader

July 13, 2011
Date

ATTORNEY DOCKET NO. **EFFEP0101US**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	:	
	:	
Hannes P. Hofmann	:	Group Art Unit: 3742
	:	
Serial No.: 10/587,691	:	Examiner: Hung D. Nguyen
	:	
Filed: 27 July 2006	:	Confirmation No.: 7045

For: METHOD OF MANUFACTURING A CIRCUIT CARRIER AND THE USE OF
THE METHOD

VIA EFS
Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

Sir:

This Reply brief is submitted in connection with the appeal of the above-identified application. The Examiner's Answer was mailed on May 24, 2011, for which a two-month period for Appellants' Reply Brief is provided. Accordingly, the present paper is timely filed without extension of time. The Board of Patent Appeals and Interferences is respectfully requested to reverse all of the rejections of the

claims in the final Office Action mailed October 12, 2010, for the reasons set forth in the Appeal Brief as supplemented by the facts set forth herein.

Argument

All of the rejections of Appellants' claims are based on the primary combination of Clothier et al. (US 2002/0177006) in view of Asai et al. (US 6240636). Appellants respectfully submit that there is no combination of Clothier et al. and Asai et al. that could possibly have rendered obvious Appellants' claimed invention at the time it was made or, for that matter, at any time, absent the impermissible use of improper hindsight reconstruction, using Appellants' own invention as a guide. Even then, as Appellants have argued previously, the elements selected by the Examiner from Clothier et al. and Asai et al. for combination are not compatible and could not be combined in any way to obtain Appellants' claimed invention, contrary to the contentions of the Examiner.

Basically, the Examiner contends that it would have been obvious to have used the PCB of Asai et al. in the process of Clothier et al. and, contrary to the teachings and clear import of Clothier et al., to have retained the layers corresponding to the PCB obtained from Asai et al., rather than removing those layers as taught by Clothier et al.

In order to better illustrate the foregoing, Appellants have prepared three sets of drawings, each corresponding to one hypothetical scenario of possible combinations of the disclosures of Clothier et al. and Asai et al. These drawings and the associated explanations, presented in the following, clearly show that the rejections are erroneous and are unsupported by any substantial evidence, and so should be reversed.

The drawings present three scenarios, designated A, B and C, to show what the combination of Clothier et al. and Asai et al. would yield. These drawings show in the first two scenarios the combination of steps using the PCB of Asai et al. and performing the manufacturing method of Clothier on the Asai substrate. Each of the three scenarios refer to the layers and steps of Clothier et al., the contended addition of layers for the PCB of Asai et al., and indication of which of Appellants' claimed steps apply, down to the "?" in each sequence, which is emphasizes the fact that the final products of these sequences fail to correspond to Appellants' claimed invention.

The first two scenarios, A and B, simply differ regarding the type of PCB Asai et al. might teach: In a first Scenario A, the entire structure of the Asai et al. reference as shown in Fig. 1 (i) is used as the starting PCB. In a second Scenario B, only part thereof, namely the inner core, consisting of the inner resin layer 4 and the two inner wiring patterns (circuits) 3, is used as the starting PCB.

In each scenario A and B, the carrier foil 1 and conductive layer 2 of the structure of Clothier et al. have then been replaced by the respective PCB in each method step which Clothier et al. teach (Appellants' claimed method steps 2A through 2F).

As Appellants have repeatedly pointed out, it is, of course, beside the point to use the PCB of Asai et al. in the Clothier et al. method, instead of Clothier's carrier foil 1 and conductive foil 2, to form the Clothier et al. trenches on Asai's PCB. This is because both the carrier foil 1 and the conductive layer 2 of Clothier et al. are used as auxiliary tools in the manufacture of the circuit board. As is clear from Clothier et al., these two items 1 and 2 are subsequently removed during the manufacturing method, since they are in fact auxiliary tools and not intended to be part of the finished product. The fact, unreasonably relied upon by the Examiner, that Clothier et al. teaches that these layers "can be removed such as by etching in a suitable etchant" ([0036]) (see below regarding definition of "can"), does not and cannot possibly change the fact that Clothier teaches the removal of these layers, does not even suggest that such removal is optional, and in fact Clothier et al. removes these layers and clearly does not consider these two auxiliary tools or layers as being part of the finished board. To the contrary, the PCB provided in Appellants' claimed method step a) of the present invention constitutes a very important part in that it offers the solution to the problem of combining high complexity of the circuitry board and very fine line circuitry on the surfaces thereof which would, using conventional methods, not be economically justifiable.

Thus, the layers in Clothier et al. relied upon by the Examiner as corresponding to an integral part of Appellants' finished product in fact forms no part of any finished product according to the Clothier et al. teachings.

Therefore, it is quite clear that a person skilled in the art would never consider using the PCB of Asai et al. in the method of Clothier et al., because the functions of

the PCB of Asai et al. on the one hand, and of the carrier foil 1 and conductive layer 2 of Clothier et al., on the other hand, are completely different.

Furthermore, there would be no motivation to a person skilled in the art to provide vias at any of the method steps 2A through 2E of Clothier et al. (corresponding to method steps (a) through (f) of the present invention) because Clothier teaches providing vias in method step 2M. Therefore, further via formation in an earlier process stage is unnecessary.

Furthermore, the sequence obtained when the PCB of Asai et al. would be used in the method of Clothier et al. shows that the PCB would have finally to be removed (in method steps 2G, 2H). Therefore, providing the PCB of Asai et al. in the method of Clothier would of course be beside the point because the main motivation to use the PCB is to use it in the circuit board and not to remove it prior to its use.

Even if the skilled person would, in an alternative Scenario C, consider starting with a PCB of Asai et al. (with one insulating resin layer 2 and copper foil 1 on one side only, which is not in fact disclosed by Asai et al.), then provide the structure having the dielectric 3 and the metal 5 of Clothier to the PCB and subsequently generate the vias as shown in Fig. 1 of Asai et al. to be formed in the metal layer 1 and dielectric 2 of Asai et al., the skilled person would not arrive at the claimed invention since, according to present claim 1, the vias and trenches are formed in the same dielectric whereas according to this Scenario the vias are formed in another dielectric than the trenches. The vias would in this Scenario be formed in the conventional PCB which does not make any sense because this PCB has conventionally been manufactured and is provided with all electric connections required so that no further vias are required to be generated therein, whereas vias shall be generated in the dielectric 3 of the structure shown in the Clothier reference.

Further, as to the allegation the Examiner makes regarding the misreading of Clothier in that Clothier would teach that the removal of the base 1, 2 would be optional, we point to the additional fact, that Clothier cannot be read in this manner because, taking Clothier as it is, i.e., with a carrier foil 1 and conductive layer 2 as the base, the removal thereof is necessary. This is because, if these items would be left in the structure being formed in the steps 2A through 20, the through vias would *have* to pierce through these two layers 1, 2 and then create a short between the circuit features formed, as noted under item "Fourth" on pages 12, 13 of the Appeal

Brief. Therefore, a person skilled in the art could not understand the removal to be optional but instead clearly understands this *removal* to be mandatory. The only optional aspect of the removal is the actual method used, e.g., the etching by a suitable etchant, which is mentioned by Clothier et al., or some other suitable method known to the person of skill in the art.

Because, as shown by the attached drawings, the PCB of Asai et al., if inserted into the process disclosed by Clothier et al., could not and would not obtain Appellants' claimed invention, it cannot have been obvious, at the time the invention was made, to have done what Appellants have done and claimed in the pending claims. While the words tortuously may be aligned as set forth in the Office Actions and rejections therein by the Examiner, in reality, when the structures are considered in accordance with the teachings of Clothier et al. and Asai et al., the combination cannot and would not have been made by any person of ordinary skill in the art. Therefore, the presently claimed invention would not have been obvious over Clothier et al. in view of Asai et al., with or without any additional references.

Finally, in view of the Examiner's continued reliance on the clearly erroneous contention that the use of the "can" in [0036] of Clothier et al. in the phrase "the carrier foil 1 can be removed such as by etching in a suitable etchant" means that removal of these layers is optional, Appellants submit herewith the dictionary definitions of the words "can" and "may", as shown in the Random House Dictionary of the English Language ("the dictionary"). Clearly, in view of the correct meaning and use of "can", this is not an optional step.

As is well known, and as shown in the dictionary in the English language, the word "can" denotes the power or ability to do something, whereas "may" refers to probability, possibility or permission. Thus, the use of "can" means that the carrier foil 1 is able to be removed by etching in a suitable etchant, not that the carrier foil 1 is permitted to, i.e., may or may not, be removed by such etching. Note, in particular, in the dictionary, the definition 2 of "may": (used to express contingency, especially in clauses indicating condition, concession, purpose, result, etc.), and the definition 3 of "may": (used to express possibility, opportunity, or permission). If Clothier et al. had used the word "may", then the Examiner's argument would have some weight. However, Clothier et al. used the word "can" and, as shown by the foregoing, the Examiner's argument has no weight at all, and is a completely

incorrect interpretation of the disclosure of the first sentence of [0036] of Clothier et al. The Examiner's interpretation of this sentence would effectively rewrite the disclosure of Clothier et al., and this cannot be allowed to happen since it is contrary to law.

Accordingly, Appellants respectfully urge the Board to reverse the rejections of the presently pending claims and to remand the application to the Examiner for issuance of a notice of allowance.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

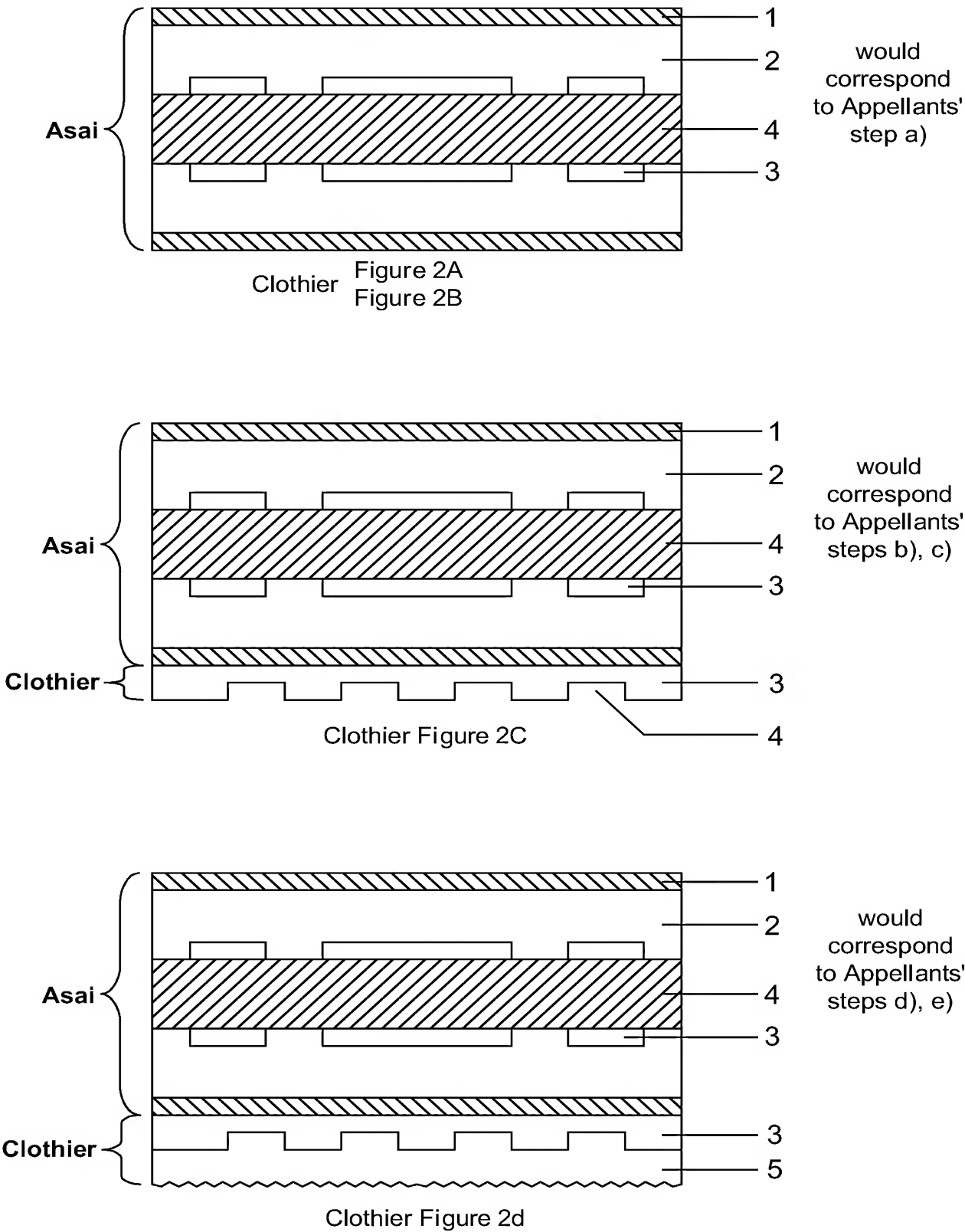
/Thomas W. Adams/

Thomas W. Adams

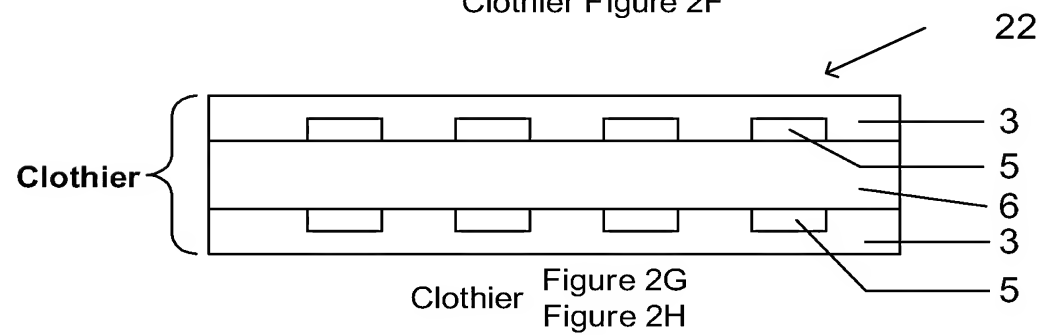
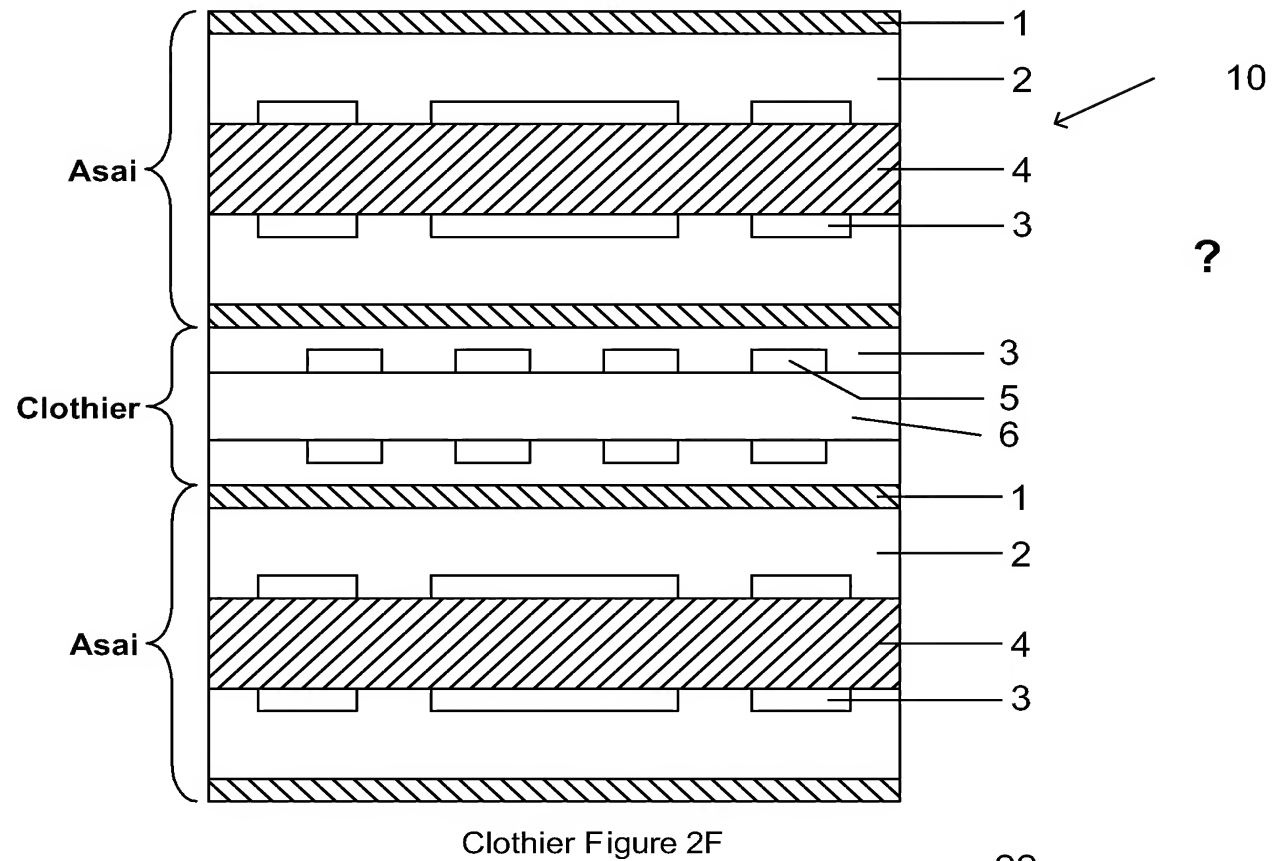
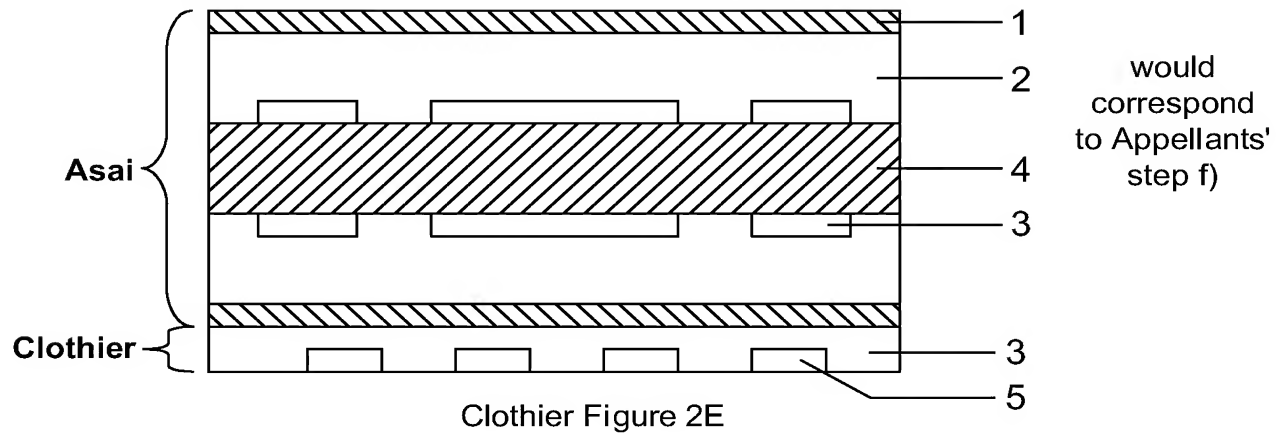
Reg. No. 35,047

The Keith Building
1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113

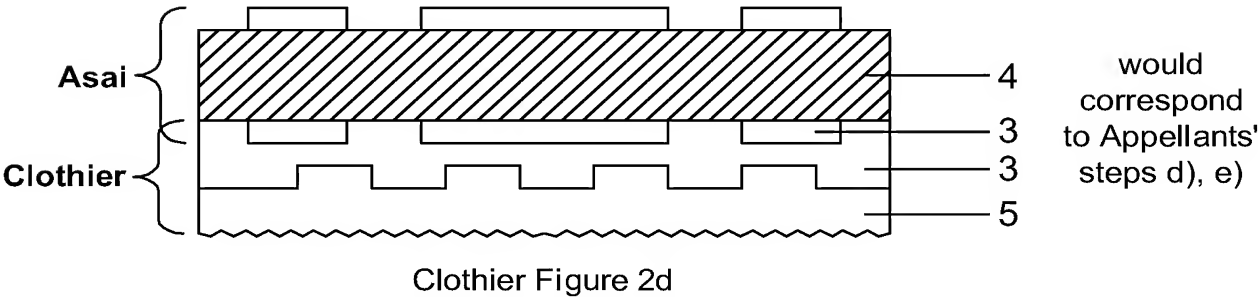
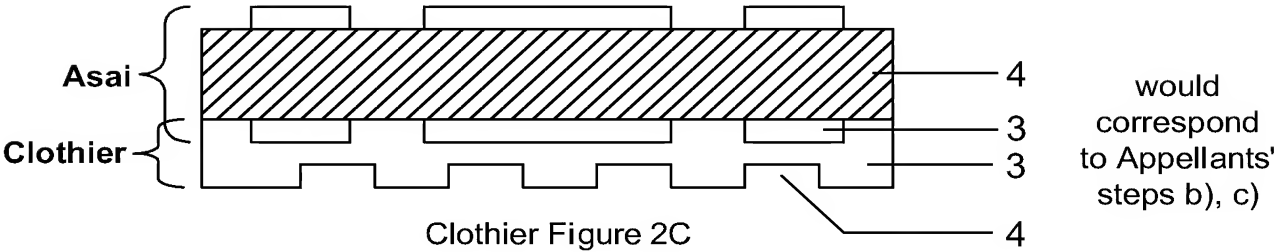
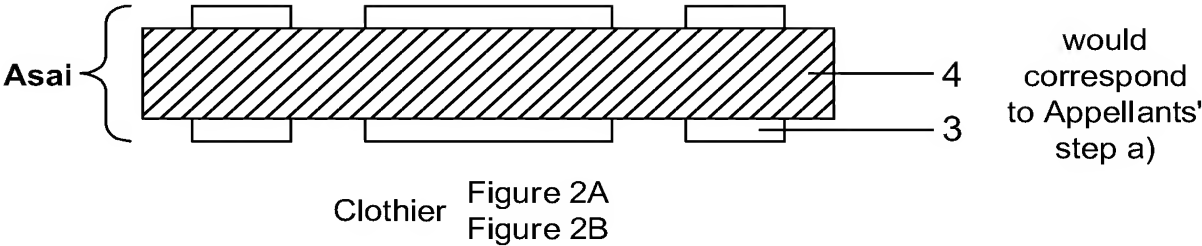
Scenario A



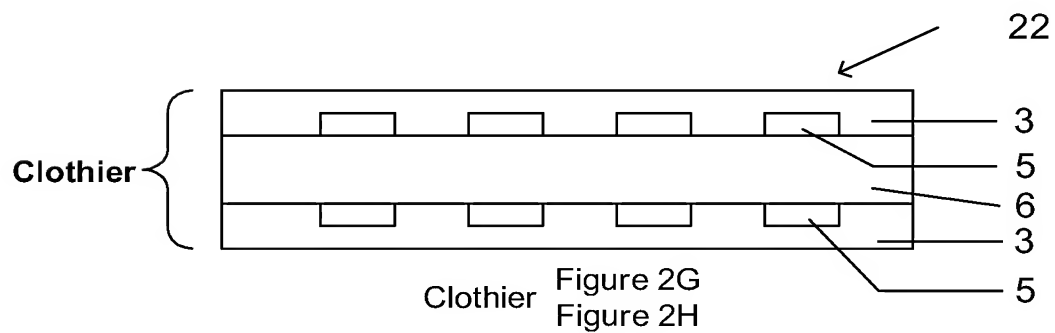
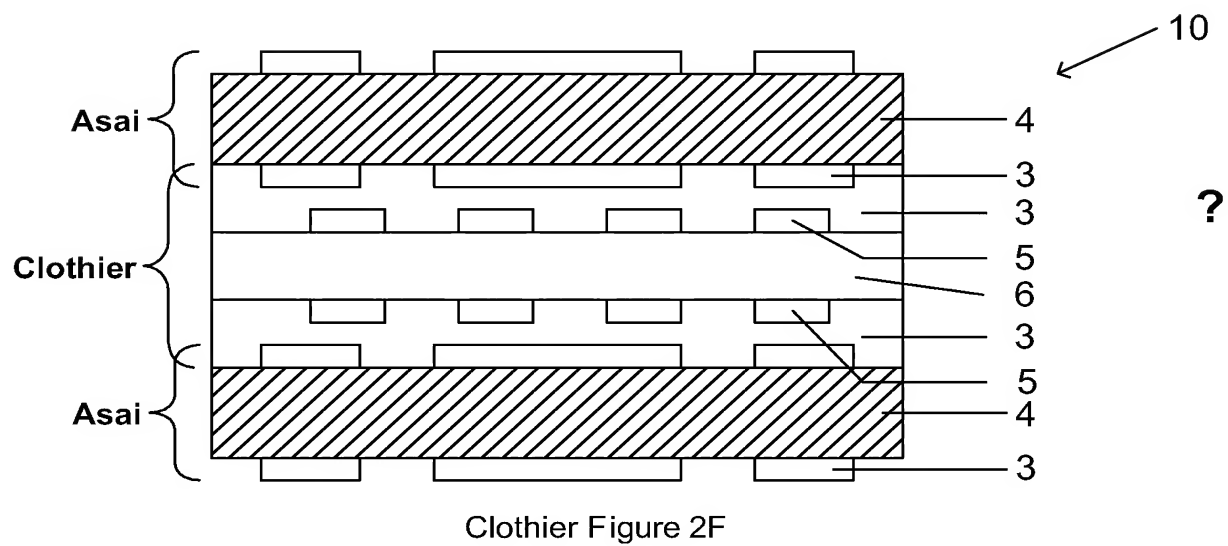
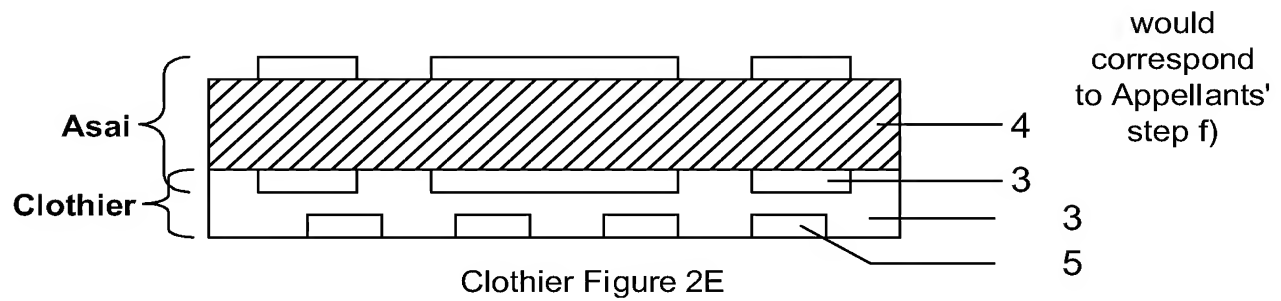
Scenario A (cont'd)



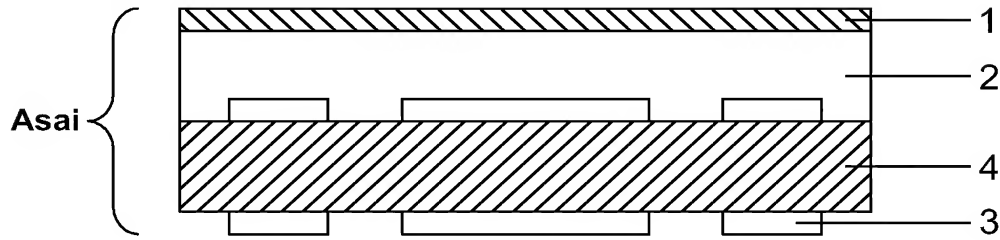
Scenario B



Scenario B (cont'd)

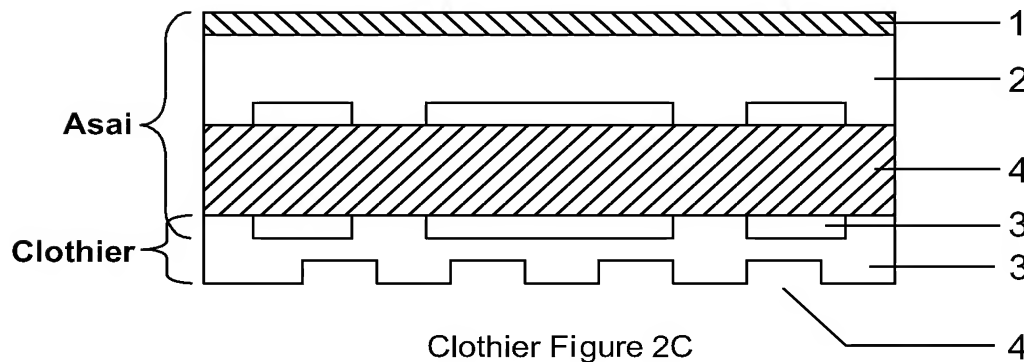


Scenario C



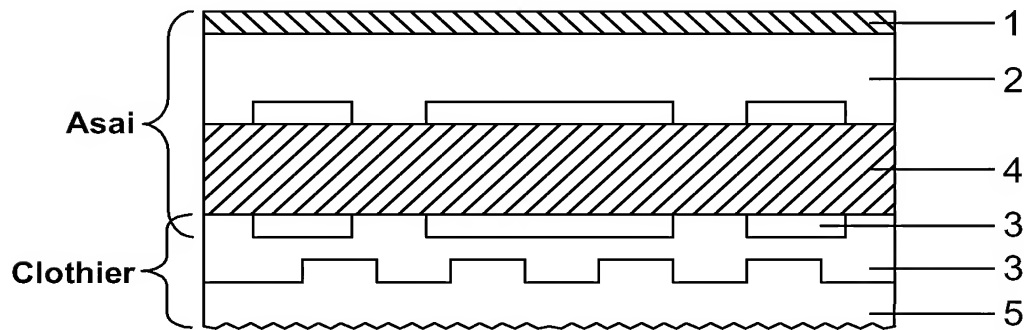
would correspond to Appellants' step a)

Clothier Figure 2A
Figure 2B



would correspond to Appellants' steps b), c)

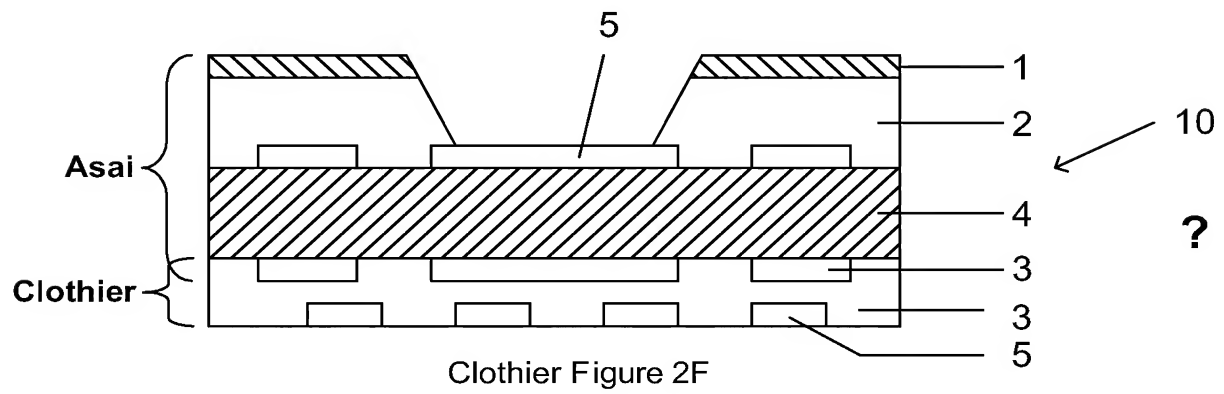
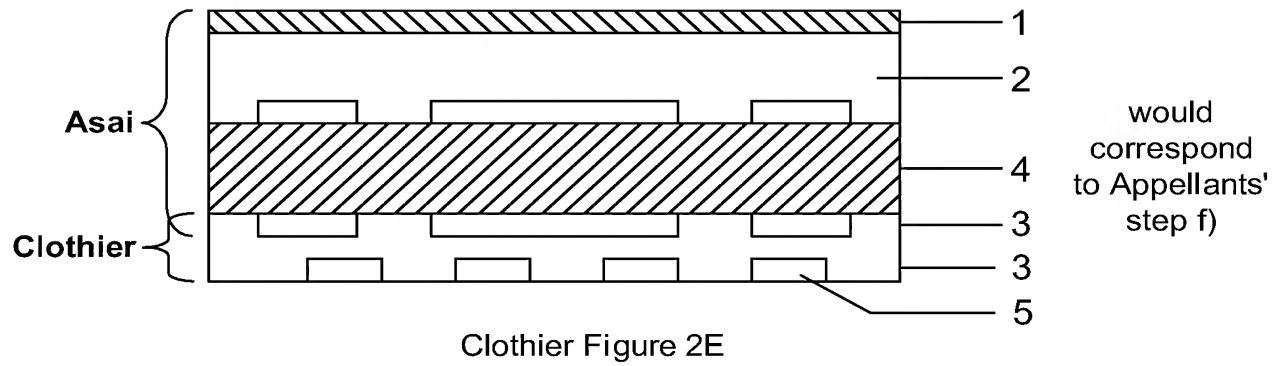
Clothier Figure 2C



would correspond to Appellants' steps d), e)

Clothier Figure 2d

Scenario C (cont'd)

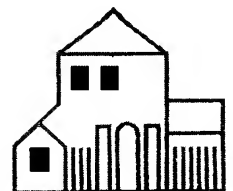


THE
RANDOM
HOUSE
DICTIONARY
of the
ENGLISH
LANGUAGE

JESS STEIN
Editor in Chief

LAURENCE URDANG
Managing Editor

RANDOM HOUSE / NEW YORK



© Copyright, 1981, 1979, 1973, 1971, 1970, 1969, 1967, 1966, by Random House, Inc.

All rights reserved under International and Pan-American Copyright Conventions. No part of this book may be reproduced in any form or by any means, electronic or mechanical, including photocopying, without permission in writing from the publisher. All inquiries should be addressed to Random House, Inc., 201 E. 50th Street, New York, N.Y. 10022.

PUBLISHED IN NEW YORK BY RANDOM HOUSE, INC.
AND SIMULTANEOUSLY IN TORONTO BY RANDOM HOUSE OF CANADA LIMITED

The Random House Dictionary of the English Language and its abbreviations *RHD* and *RHDEL* are trademarks of Random House, Inc.
rd. ra/ue

Library of Congress Catalog Card Number: 74-129225

A number of entered words which we have reason to believe constitute trademarks have been designated as such. However, neither the presence nor the absence of such designation should be regarded as affecting the legal status of any trademark.

The Concise French Dictionary, edited by Francesca L. V. Langbaum, Copyright, 1954, by Random House, Inc.

The Concise Spanish Dictionary, edited by Donald F. Solá, Copyright, 1954, by Random House, Inc.

The Concise Italian Dictionary, edited by Robert A. Hall, Jr., © Copyright, 1957, by Random House, Inc.

The Concise German Dictionary, edited by Jenni Karding Moulton, © Copyright, 1959, by Random House, Inc.

Major Dates in World History, edited by Charles D. Lieber and Anne Dyer Murphy, © Copyright, 1964, by Random House, Inc.

Entire contents of the *Atlas* and the index to the maps, © Copyright, 1966, by C. S. Hammond & Company.

Chart of Periodic Table of the Elements, © Copyright, 1964, by E. H. Sargent & Co.

Table of Common Proofreader's Marks, Copyright, 1950, © 1956, by Alfred A. Knopf, Inc.

Manufactured in the United States of America

), n., pl.
omewhat
equiv. to



anile

name of

ti. bell-

(us). See

the third

miles in

er, 1788-

o-founder

of Christ

architect

Scottish

urist and

5. Mrs.

English

us leader,

lexander,

as, 1777-

n/or men,

tatesman,

ctices and

Alexander

Sometimes

st. [after

l. a town

eaport in

osite ends

is a ceiling

rt of out-

oman who

od. [alter.

E Mexico,

0); 19,672

this state

he Gulf of

ups out for

erson who

l. a comut

wheels,

ramping

l]

am/par-

clusters of

om proper

se/a5), n.

l. America

aining to

campster

(x) + -AL]

r fire for

ion of sol-

on (Camp-

character,

cially con-

e, who fol-

low synapo-

o which he

ng to their

for a camp

a colorless,

occurring

l; prepared

ate in the

camp(ora)

559 (1960).

l. borneol.

a whitish,

ene ketone

used chiefly

dicine as a

eatment of

l. [< ML,

ur; r. ME

camphorated oil, *Pharm.* a solution of one part camphor oil in four parts cottonseed oil, used as a counterirritant. Also called **camphor liniment**.

camphor ball, a small ball of naphthalene, camphor, etc., used as a moth repellent.

camphor ice, a cosmetic preparation composed of camphor, spermaceti, white beeswax, and a vegetable oil, used chiefly in the treatment of mild skin eruptions.

camphor oil, a colorless liquid obtained from the wood of the camphor tree by distillation and separation from the solid camphor, used in varnish, soaps, shoe polish, and in medicine chiefly as a rubefacient.

camphor tree, 1. a lauraceous tree, *Cinnamomum Camphora*, of Japan, Formosa, China, etc., yielding camphor. 2. any of various similar trees, as *Dryobalanops aromatica*, of Borneo, Southeast Asia, etc., which yields borneol.

camphor weed (kam'fər wēd'), n. vinegarweed. [CAMPHOR + WEED]

Cam-pi-gnial (kam pēn'yən), *adj.* of or pertaining to an early Neolithic culture in France marked by the production of rough-hewn tools, scrapers, and axes, and by a crude style of pottery. [after *Campigny*, French town + -AN]

cam-pim-e-ter (kam pīm'i'tər), n. *Ophthalm.* an instrument for determining the visual field. [*< L* campī- (comb. form of *campus* field) + -METER] —**cam-pim-e-tri-cal** (kam'pə me'tri kəl), *adj.* —**cam-pim-e-try**, n.

Cam-pi-na Gran-de (kām'nə pē'nə grān'də), a city in NE Brazil. 126,274 (est. 1960).

Cam-pi-nas (kam pē'nəs; *Port.* kām'nə pē'nəs), n. a city in SE Brazil, NNW of São Paulo. 184,529 (1960).

cam-pi-on (kam'pēn), n. any of several Caryophyllaceous plants of the genera *Lychnis* or *Silene*. [special use of *campion*, old var. (< AF) of *CHAMPION*]

Cam-pi-on (kam'pēn), n. Thomas, 1567-1620, English songwriter and poet.

camp/meet-ing, a religious gathering, usually lasting for some days, held in a tent or in the open air.

cam-po (kam'pō, kām'-), n., pl. -pos. (in South America) an extensive, nearly level, grassy plain. [*< Sp < L* camp(us) field]

Cam-po-bello (kam'pō bē'lō, -pə-), n. an island in SE Canada, in New Brunswick province. 1137 (1961).

cam-po-de-an (kam'pō dē'ən), n. a campodeid. [*< Gk* kām'pō caterpillar + -ōdēs -ODE + -AN]

cam-po-de-id (kam'pō dē'id), n. 1. any eyeless, wingless, primitive insect of the family *Campodeidae*, having two long, many-segmented appendages at the rear of its abdomen. —*adj.* 2. belonging or pertaining to the family *Campodeidae*. [*< NL* *Campodeidae* (ae) name of the family, equiv. to *Campode* (a) name of the genus (< *Gk* kām'pē caterpillar + *NL* -odea -ODE) + -idae -ID]

cam-po-de-i-form (kam'pō dē'ə fōrm'), *adj.* resembling a campodeid in form, as the larvae of certain insects. [CAMPODEID + -i- + -FORM]

Cam-po-for-mio (kām'pō fōr'myō), a village in Friuli-Venezia Giulia, in NE Italy, NW of Trieste; treaty between Austria and France 1797. 4261 (1961). Modern, **Cam-po-for-mi-do** (kām'pō fōr'mē dō).

Cam-po-Gran-de (kām'pō grān'də), a city in SW Brazil. 31,708 (1950).

cam-pong (kām'pōng, -pōng, kām'pōng', -pōng'), n. kampong.

cam-po-pea, *Pride-of-California*.

cam-po-ree (kam'pō rē'), n. a small camp gathering of Boy Scouts, usually from a region or district (distinguished from *Jamboree*). [CAMPI + (JAMB)OREE]

Cam-pos (kām'pōs), n. a city in E Brazil, near Rio de Janeiro. 277,459 (est. 1957).

cam-po-san-to (kām'pō sän'tō), pl. *It.* **cam-pi san-ti** (kām'pē sän'tē), *Sp.* **cam-pos san-tos** (kām'pōs sän'tōs), *Italian, Spanish*, a cemetery. [lit., holy field]

camp-out (kamp'out'), n. a camping out of a group. Also, **camp/out**. [n. use of v. phrase *camp out*]

camp-shed (kamp'shed'), *v.t.* -shed, -shed-ding, to line (the bank of a river) with campshot. [var. of CAMPSHOT]

camp-shot (kamp'shot'), n. *Brit.* a facing of planks and piles placed along the bank of a river to prevent erosion. Also called **camp/shed/ding**, **camp/sheet/-ing**. [?]

camp-site (kamp'sit'), n. a place used or suitable for camping. Also, **camp/-site**. [CAMPI + SITE]

camp-stool (kamp'stōol'), n. a light folding seat. [CAMPI + STOOL]

camp/stove, a portable stove used by campers for cooking or heating.

camp-us (kam'pəs), n., pl. -pus-es. *U.S.* 1. the grounds of a college or other school. 2. a college or university: *The large influx of G.I.'s after the war radically changed many campuses throughout the country.* 3. the world of higher education as exemplified in the social, intellectual, etc., life of a college or university: *Government and foundation grants have had a marked effect on the character of the American campus.* [*< L*: flat place, field, plain]

camp-y (kam'pē), *adj.* **camp-i-er**, **camp-i-est**. *Slang.* 1. amusingly outlandish, affected, theatrical, or banal: *He had a campy British accent.* 2. created as artificial or affected; containing extravagant flourishes; mannered. 3. exhibiting excessive sensibility, elegance, and style. 4. conspicuously displaying homosexual gestures, speech mannerisms, etc. [CAMPI + -Y]

camp-y-lite (kam'pē lit'), n. *Mineral.* a yellow to brown variety of mimetite. Also, **kampylite**. [*< Gk* kampylōs curved + -ITE]

camp-y-lot-ro-pous (kam'pō lō'trō pōs), *adj.* *Bot.* (of an ovule) curved so that the true apex or micropyle is almost at the base. [campylo- (< *Gk* kampylo-, deriv. of kampylōs) curved) + -TROPOUS]

cam-shaft (kam'shaft', -shāft'), n. a shaft bearing integral cams. [CAM + SHAFT]

Ca-mus (ka my'), n. Albert (Al ber'), 1913-60, French novelist, short-story writer, playwright, and essayist; Nobel prize 1957.

can (kan; unstressed kən), *auxiliary v.* and *v.*, *pres. sing.* 1st pers. **can**, 2nd pers. **can** or (Archaic) **could**, 3rd pers. **can**, *pres. pl.* **can**, *past sing.* 1st pers. **could**, 2nd pers. **could** or (Archaic) **couldst**, 3rd pers. **could**, *past pl.* **could**. For auxiliary v. imperative, infinitive, and participles lacking. For v. (Obs.): imperative **can**; infinitive **can**; past part. **could**; *pres. part.* **cun-ning**. —*auxiliary verb.* 1. to be able to;

gnate with; deriv., derivative; equiv., equivalent; imit., imitative; own, perhaps; * hypothetical. See the full key inside the front cover.

have the ability, power, or skill to: *She can solve the problem easily, I'm sure.* 2. to know how to: *He can play chess, although he's not particularly good at it.* 3. to have the power or means to: *A dictator can impose his will on the people.* 4. to have the right or qualifications to: *He can change whatever he wishes in the script.* 5. may; have permission to: *Can I speak to you a moment?* —*v.t.*, *v.i.* 6. Obs. to know. [ME, OE, *pres. ind. sing.* 1st, 3rd pers. of *cunnan* to know, know how; *c. G.* *leel*, *Goth kann*; see *KEN, KNOW*]

—*Syn.* 1-5. **CAN** denotes power or ability to do something: *The child can talk.* **MAY** refers to probability, possibility, or permission: *Our son may (possibility) or probably (permission) play football Saturday if the doctor says he may (permission).* The two words are often confused in asking or granting permission; **MAY** is the preferred usage. On the other hand, **CANNOT** is often used in nonformal situations to deny permission: *May I go? Yes, you may go (or, You may not or cannot go).* **CANNOT** is also used to express either extreme negation of ability or probability: *I cannot work such long hours. I cannot (possibly) be mistaken.*

—*Usage.* **CAN** BUT, **CANNOT** BUT are formal expressions suggesting that there is no possible alternative to doing a certain thing. **CAN** BUT is equivalent to informal **ONLY**: *We can but do our best* (1. and must make the attempt; or 2. and no more than that should be expected of us). **CANNOT** BUT (do) is equivalent to informal **CAN'T** HELP (doing): *We cannot but protest against injustice* (we are under moral obligation to do so). **CANNOT** HELP BUT is common in familiar use, but is frequently frowned upon by careful speakers.

can² (kan), n., v., **canned**, **can-ning**. —*n.* 1. a container for food, milk, etc., usually of sheet iron coated with tin or other metal. 2. a receptacle for garbage, ashes, etc. 3. a bucket, pail, or other container for holding or carrying liquids: *water can*. 4. a drinking cup; tankard. 5. *Slang.* toilet; bathroom. 6. *Slang.* jail; *He's been in the can for a week.* 7. *Slang.* the buttocks. 8. *Mil.* *Slang.* a depth charge. 9. *in the can*, (of film) exposed, developed, and edited; ready for distribution or exhibition. —*v.t.* 10. to preserve by sealing in a can, jar, etc. 11. *Slang.* to dismiss; fire. 12. *Slang.* to throw (something) away. 13. *Slang.* to stop (saying, doing, or making something): *Can that noise!* [ME, OE *canne*, *c. G.* *Kanne*, *leel kann*, all perh. < WGM; cf. *LL* *canna* small vessel < *L. c.* *Gk kanna* CANE]

Can, 1. Canada. 2. Canadian.

can, 1. canon. 2. canto. **Can-a** (kā'nə), n. an ancient town in N Israel, in Galilee; scene of Jesus' first miracle. John 2:1,11.

Can-na-an (kā'nən), n. 1. the ancient region lying between the Jordan, the Dead Sea, and the Mediterranean; the land promised by God to Abraham. Gen. 12:5-10. 2. Biblical name of Palestine. 3. any land of promise. 4. Also, *Douay Bible*, *Chanaan*, a descendant of Ham, the son of Noah. Gen. 10. [*< LL* *Chanaan* < *Gk* < *Heb* *Kēna'an*]

Can-na-an-ite (kā'nə nīt'), n. 1. a member of a Semitic people that inhabited parts of ancient Palestine and were conquered by the Israelites and largely absorbed by them. 2. a group of Semitic languages, including Hebrew and Phoenician, spoken chiefly in ancient Palestine and Syria. —*adj.* 3. of, pertaining to, or characteristic of Canaan, the Canaanites, or the group of Semitic languages known as Canaanite. [ME < *Gk* *Kananitēs*; see -ITE] —**Can-na-an-it-ish** (kā'nə nīt'ish), *Can-na-an-it-ic* (kā'nə nīt'ik), *adj.*

Can-a-ce (kā'nə sē'), n. 1. *Class. Myth.* a daughter of Aeolus who committed suicide at her father's command because of her incestuous relations with her brother Macareus. 2. a girl's given name.

Canad, Canadian.

ca-ñi-da (kā'n yā'də, -yad'), n. *Chiefly* Western U.S. 1. a dry riverbed. 2. a small, deep canyon. [*< Sp.* equiv. to *cañ(a)* CANE + -ada n. suffix]

Can-a-da (kā'nə də), n. a nation in N North America; a member of the British Commonwealth of Nations. 18,238,247 (1961); 3,690,410 sq. mi. *Cap.*: Ottawa.

Can-ada bal-sam, a pale yellow or greenish, slightly fluorescent, clear, viscous, bitter-tasting, water-insoluble liquid, having a pleasant aromatic pinelike odor, and solidifying on exposure to air; obtained from the balsam fir, *Abies balsamea*, and used chiefly for mounting objects on microscope slides, in the manufacture of fine lacquers, and as a cement for lenses. Also called *Canada turpentine*, *balsam of fir*.

Can-ada bar-ber-y. See *Allegheny barberry*.

Can-ada blue-grass, a European, perennial grass, *Poa compressa*, naturalized in North America, having creeping rootstocks and bluish-green leaves. Also called *wire grass*.

Can-ada crook-neck, a cushion.

Can-ada goose, a common wild goose, *Branta canadensis*, of North America. See *illus.* under *goose*.

Can-ada jay, a gray jay, *Perisoreus canadensis*, of northern North America, noted for its boldness in stealing food from houses, traps, camps, etc. Also called *whiskey jack*.

Can-ada lil-y. See *meadow lily*.

Can-ada lynx. See *under lynx*.

Can-ada moon-seed, a vine, *Mentispermum canadense*, of eastern North America, having soft, hairy leaves when young and black, grapelike fruit. Also called *yellow perilla*.

Can-ada pota-to. See *Jerusalem artichoke*.

Can-ada this-tle, an Old World herb, *Cirsium arvense*, having small purple or white flower heads, now a troublesome weed in North America.

Can-ada tur-pentine. See *Canada balsam*.

Ca-na-di-an (kā'nā dē'an), *adj.* 1. of Canada or its people: *the Canadian government*. —*n.* 2. a native or inhabitant of Canada. [CANAD(A) + -IAN; cf. *F* *canadien*]

Can-a-dian ba-con, bacon taken from a boned strip of pork loin.

Can-a-dian foot/ball, football and Rugby that is yards by two twelve-man

Can-a-dian French/, language in Canada, esp. scendants of the settlers o

Can-a-dian hem/lock. (kā'nā to Canada and its institu thing peculiar to Canada usage peculiar to the peop

Ca-na-di-an-ize (kā'nā -iz-ing, to make or bec assimilate to the customs [CANADIAN + -IZE] —Ca

Can-a-dian River/, a Mountains in NE New a in E Oklahoma. 906 mi. l

Can-a-dian whis/key. ca-na-fis-tu-la (kā'nā/ya pipe tree. Also, ca-na-fis canafistula, equiv. to cana

ca-nal-gre (kā'nī/grē), i hymenosepalus, found fr having clustered, tuberc [< MexSp]

ca-naille (kā'nāl'; *Fr.* kā < *F* < *lt* *canaglia* pack < *l. canis* + -aglia collie

Can-a-jo-har-le (kan'ə New York. 2681 (1960).

can-a-kin (kā'nə kin), n. can-al' (kā'nāl'), n., v., -n-al-ing, —*n.* 1. an artifi irrigation, etc. 2. a long trating far inland. 3. a food, air, etc., esp. in an a

canal, (in classical arch cut for visual effect. 5. —*adj.* 6. to make a cana canals. [late 18E; water] to can(na)led, pipe (see

ca-nal' (kā'nāl'), n. As dark lines on the surface c scopically from the earth can(al)s; see CANAL']

ca-na-la-tu-ra (kā'nə/la mentation on primitive channels. [*< lt*; see CAN

can-al/boat/, a sel adapted to service in a

Ca-na-let-to (kā'nə/let-to nio (ā'nō/nyō), (Canal 2 See Bellotto, Bernard

can-a-lic-u-lus (kā'nə/anal., *Zool.* a small cana [*< L* equiv. to *canal*](s)

a-lic/u-lar, can-a-lic-u-l can-a-lic/u-lat'ed, *adj.* alic/ya lā'shən), n.

ca-na-lis (kā'nāl'is, -nā/lās), canal' (def. 4)

can-al-ize (kā'nāl'iz, l Chiefly Brit. canalize. -

can-al-ize (kā'nāl'iz, l 1. to make a canal or car a canal. 3. to divide (a or dams, usually to ma

divert into certain chan provide a certain outlet f

iza-tion, n.

can-al-ler (kā'nāl'ər), on canals. [CANAL' + -

can-al/ ray/, *Physic* traveling from a metalli discharge tube. Also cal

Can-al/Zone/, a zor the Isthmus of Panama; Canal: leased perpetually ab. 10 mi. wide; excludes 38,953 (1960); 553 sq. n

Can-an-dai-gua (ka central New York. 9370

Ca-na-ne-a (kā'nə nē/ city in N Mexico: copi (1950). —*Can-a-ne-an*

can-a-pé (kā'nə pē, -p (-pēz, -pāz'; *Fr.* -pāz'), etc., spread or topped or other appetizing food

century France, made with matching chairs. in which short suits. *F*: lit., a covering or net by extension for a piece

Ca-na-ra (kā'nā rā, kā can-nard (kā'nārd'; *Fr.* -nār'), 1. a false derogatory; hoax. 2. C for food. 3. Aeron. a s stabilizer and elevator b. an early airplane h rudder and elevator [*< F*: lit., duck; *OF* qu to *can*(er) (to) cackle +

Ca-na-re-se (kā'nā rē Kanarese.

Can-a-ries cur-rent Atlantic flowing south

ca-na-ry (kā'nār'y), n. *canarius*, native to the a pet. in the wild state; and yellow below, and bright or pale yellow

a light, clear yellow co Canary Islands, resem singer, esp. one who sh a person who, appreh accomplices. *cf.* sto

dance of the 16th anc —*adj.* 7. having the co (Grand) Canary < *L* equiv. to <

May-f *a doll, puppet, re built to resemble a human person who seems to have the*
2. Obs. an idol, a false god.
1. special use of Mahomet was thought to be an object
 n.
May-f *Scot.* must. Also,
 f. Icel *man must*, shall, will
 kē/a, mō/nā kē/a, and
 d of Hawaii. 13,784 ft.
 13/a, mō/nā, an active
 wald. 13,880 ft.
Heraldry. manche. Also,

of weight in India and other
 according to locality: in
 180 pounds (the latter being
 <Hindi man < Skt manā>

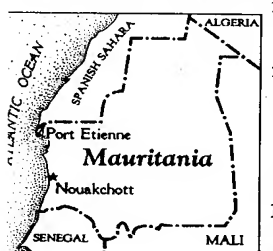
1. to talk in a rambling,
2. to move, go, or act in
 ier: *He maundered through*
 [7] —**maun-der-er**, n.
 the ceremony of washing
 memorizing Jesus' washing
 sundy Thursday. **2.** Also
 only distributed as alms in
 money of maundy or on
 maunde < OE *mande* < L
 munde (from the opening
 ulate) of Jesus' words to
 ashed their feet). See MAN-

he Thursday of Holy Week,
 t Supper and His washing
 at day.

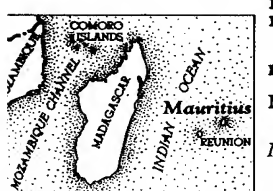
it; Fr. mō pa sän/, n.
 ty de (än rē rō nē/), Al-
 nch short-story writer and

given name, Irish form of
 a girl's given name, Irish
 one, *Mau-rine*/.
 aē/a, n. an ancient king-
 ulated the territory that
 of Algeria. Also, Mauri-
 ad/, n.

Frans-çois (frän swa/),
 Nobel prize 1952.
 mō res/; for 3 also Fr.



ē/a, n. 1. Official name,
ritania, a republic in W
 Desert; formerly a French



dependencies, formerly a
 2); 809 sq. mi. Cap.: Port
 ince. —**Mau-ri-tian**, adj.
 giant lily.

Fr Mauro.
André (än drä/), (Emile
 1885-1967, French biogra-

1. 3; mou/rē for 2), n. 1.
 /, fon/tān), 1806-73, U.S.
 2. a walled plain in the
 the moon: about 12 miles

a member of an ancient
 thern India and established
 (au/ry-an, adj.

Paul, 1838-1914, and his
 German inventors of fire-

n. -za-), n., pl. -le-ums,
 and magnificent tomb.
 2. alcairnassus in Asia Minor
 nder of the World, [C
 mb of Mausolus, king of

town in central Wisconsin.

ish purple. 2. a purple dye
 vered in 1856; the first of
 of the color of mauve: a
 w < L *maiva* MALLOW]

Mo's as a social and cultural
 perity and complacency.
 v/rik/, n. 1. *Southwestern*
 or steer, esp. an unbranded
 its mother. 2. a dissenter,
 or a politician, who takes
 om his associates. [named

after Samuel A. Maverick (1803-70), Texas pioneer who
 neglected to brand his cattle]

ma-vin (mā/vin), n. an expert, esp. in everyday mat-
 ters. Also, **ma/ven**. [C Yiddish < Heb: connoisseur]

ma-vis (mā/vīs), n. *Brit. Chiefly Poetic.* a song thrush.
 [ME *mayvis* thrush < MF *mauvis* < ?]

Ma-vis (mā/vīs), n. a girl's given name.

Ma-vors (mā/vōrs), n. *Rom. Religion.* Mars.

ma-vour-neen (mā vōr/nēn, -vōr/-, -vōr/-), n. *Irish*
English. darling; dear. Also, **ma-vour/nin**. [C Ir mo
 mhúirín]

maw¹ (mō), n. 1. the mouth, throat, or gullet of an
 animal, esp. a carnivorous mammal. 2. the crop or
 craw of a fowl. 3. the stomach, esp. that of an animal.
 4. a cavernous opening that resembles the jaws of an
 animal: the gaping maw of hell. 5. the symbolic or
 theoretical center of a voracious hunger or appetite of
 any kind: the ravenous maw of Death. [ME *mawe*, OE
magā; c. D *maag*, G *Magen*, Icel *magi*]

maw² (mō), n. *Dial.* mother. [var. of MA]

maw-kin (mō/kin), n. malkin.

maw-lish (mō/kish), adj. 1. having a faint sickly
 flavor; slightly nauseating; insipid. 2. characterized
 by sickly sentimentality; feebly emotional. [Obs. *maw*
 maggot (late ME < Scand; cf. Icel *mathkr* maggot) +
 -ish]. See MAGGOT.] —**maw/ish-ly**, adv. —**maw/-**
ish-ness, n.

Maw-son (mō/sən), n. Sir Douglas, 1882-1958,
 Australian antarctic explorer, born in England.

Max (maks), n. a boy's given name, form of Maxi-
 milian.

max, maximum.

max-i (mak/sē), n. 1. maxiskirt.
 —adj. 2. of the length of a maxi-
 skirt. [by shortening]

Max-ile (mak/sē), n. a boy's
 given name, form of Max. Also,
 Maxy.

max-il-la (mak sil/ə), n., pl. **max-
 il-lae** (mak sil/ē), 1. a jaw or
 jawbone, esp. the upper. 2. one
 of the paired appendages immedi-
 ately behind the mandibles of
 arthropods. [C NL, special use of
 L *maxilla* lower jaw, dim. of *māla*
 (earlier **maxila*) upper jaw, cheek-
 bone]

max-il-lar-y (mak/sē lər/ē, mak sil/ə rē), adj., n., pl.
 -lar-ies. —adj. 1. of or pertaining to a jaw, jawbone, or
 maxilla. —n. 2. a maxilla or maxillary bone. [C L
maxillā(is) of, belonging to the jaw. See MAXILLA, -ARY]

max-il-lip-ed (mak sil/ə ped/), n. one member of the
 three pairs of appendages situated immediately behind the
 maxillae of crustaceans. [MAXIL(A) + -i + -PED]
 —**max/il-lip-ed-a-ry**, adj.

max-im (mak/sim), n. 1. an expression of a general
 truth or principle, esp. an aphoristic or sententious one:
 the maxims of La Rochefoucauld. 2. a principle of
 conduct: It was his maxim never to give a sucker an even
 break. [ME *maxime* < ML *maxima* (orig. in phrase
maxima propositio axiom, lit., greatest proposition),
 fem. of L *maximus*, superl. of *magnus* great; see MUCH]

—Syn. 1. aphorism, saying, adage, apothegm. See
 proverb.

Max-im (mak/sim), n. 1. Hiram Percy, 1869-1936.
 U.S. inventor. 2. his father, Sir Hiram Stevens,
 1840-1916, English inventor, born in the U.S. 3. Hud-
 son, 1853-1927, U.S. inventor and explosives expert
 (brother of Sir Hiram Stevens Maxim).

Max-im (Fr. mak sēm/; Russ. mā ksem/), n. a boy's
 given name, form of Maximilian.

max-i-ma (mak/sə mā), n. a pl. of maximum.

max-i-mal (mak/sə māl), adj. of or being a maximum;
 greatest possible; highest. [MAXIM(UM) + -AL]
 —**max/i-mal-ly**, adv.

max-im-al ide-al, *Math.* an ideal in a ring which is
 not included in any other ideal except the ring itself.

Max-i-mal-ist (mak/sə māl ist), n. a member of an
 extremist group or faction of socialists. Cf. Minimalist.
 [MAXIMAL + -IST]

Max-imes (Fr. mak sēm/), n. (*Réflexions ou sentences et
 maximes morales*) a collection of paradoxical, cynical
 maxims and gnomic reflections (1665) by La Roche-
 foucauld.

Max-im gun, an early single-barreled, water-cooled
 machine gun cocked by the force of its own recoil.

Max-i-mil-i-an (mak/sə mil/yan), n. 1. 1832-67,
 archduke of Austria; emperor of Mexico 1864-67.
 2. Also, **Max**, **Maxim**, a boy's given name.

Maximilian I, 1459-1519, emperor of the Holy
 Roman Empire 1493-1519.

Maximilian II, 1527-76, emperor of the Holy
 Roman Empire 1564-76.

Max/imil-i-an armor, full plate armor of the early
 16th century, representing a combination of Italian and
 German styles and characterized by extensive use of
 fluting for lightness and strength.

max-i-min (mak/sə min), n. a strategy of game theory
 employed to maximize a player's minimum possible
 gain. Cf. minimax. [MAXIM(MUM) + MIN(IMUM)]

max-i-mise (mak/sə miz/), v.t., -mised, -mis-ing.
Chiefly Brit. maximize. —**max/i-mi-sa-tion**, **max/i-
 ma-tion**, n. —**max/i-mis-er**, n.

max-im-ite (mak/sə mīt/), n. *Chem.* a powerful ex-
 plosive consisting primarily of picric acid. [named after
 Hudson MAXIM; see -ITE]

max-i-mize (mak/sə miz/), v.t., -mized, -miz-ing.
 to increase to the greatest possible amount or degree: *He
 maximized his importance in the program, minimizing
 the contributions of the rest.* Also, esp. *Brit.*, **maximize**.
 [MAXIM(UM) + -IZE] —**max/i-mi-za-tion**, **max/i-ma-
 zation**, n. —**max/i-miz-er**, n.

max-i-mum (mak/sə mēm), n., pl. -mums, -ma (-mō),
 adj. —n. 1. the greatest quantity or amount possible,
 assignable, allowable, etc.; the highest amount, value,
 or degree attained or recorded (opposed to minimum):
They increased the speed of the car to the maximum.
 2. *Math.* a. Also called relative maximum, local maximum.
 the value of a function at a certain point in its
 domain, which is greater than or equal to the values
 at all other points in the immediate vicinity of the point.
 Cf. absolute maximum. b. the point in the domain at
 which a maximum occurs. —adj. 3. that is a maximum;

greatest possible; highest: *maximum satisfaction*. 4. per-
 taining to a maximum or maximums. [C L, n. use of
 neut. of *maximus*, superl. of *magnus* great, large]
 —**max/i-mum-ly**, adv.

max/imum like/lihood estima-tion, *Statistics*.
 a method of estimating population characteristics from
 a sample by choosing the values of the parameters
 which will maximize the probability of getting the par-
 ticular sample actually obtained from the population.

max/imum prin/ciple, *Math.* the theorem that a
 function of a complex variable that is analytic in a
 domain and on its boundary attains its maximum
 absolute value on the boundary. Also called **max/imum
 mod/ulus prin/ciple**.

max/imum thermom/eter, a thermometer de-
 signed to show the highest temperature recorded be-
 tween resettings. Cf. minimum thermometer.

Max-ine (mak sēn/, mak/sēn), n. a girl's given name.

max-i-skirt (mak/sē skūrt/), n. a long skirt or skirt
 part, as of a coat, dress, etc., ending below the middle of
 the calf but above the ankle. Also, **maxi**. [MAXI(MUM)
 + SKIRT; modeled on MINISKIRT]

Max Müller (maks mul/or; Ger. mäs my/lər),
 Friedrich-rich (frē/drik; Ger. frē/drikg). See Müller,
 Friedrich Max.

max-well (maks/wəl, -wel), n. *Elect.* the centimeter-
 gram-second unit of magnetic flux, equal to the magnetic
 flux through one square centimeter normal to a magnetic
 field of one gauss. Abbr.: Mx Also called line. [named
 after J. C. MAXWELL]

Max-well (maks/wəl, -wel), n. 1. Elsa, 1883-1963,
 U.S. professional hostess and author. 2. James Clerk
 (klārk), 1831-79, Scottish physicist. 3. a boy's given name.

Max/well-Boltz-mann statis-tics (maks/wəl-
 bōltz/mān, -mon, -wel), *Physics*. statistics for classical
 physics, based on the assumption that in a given
 physical system consisting of indistinguishable particles
 and regions, all possible arrangements of the particles
 in the various regions have equal probability. [named
 after J. C. MAXWELL and Ludwig Boltzmann]

Max/well de-mon, *Physics*. a hypothetical agent
 or device of arbitrarily small mass that is considered
 selectively to admit or block the passage of individual
 molecules from one compartment to another according
 to their speed, constituting a violation of the second
 law of thermodynamics. [named after J. C. MAXWELL]

Max-y (mak/sē), n. a boy's given name, form of Max.
 Also, **Maxie**.

may¹ (mä), v., pres. sing. 1st pers. may, 2nd may or
 (Archaic) may-est or mayst, 3rd may; pres. pl. may;
 past might. 1. (used to express wish or prayer): *May
 you live long.* 2. (used to express contingency, esp. in
 clauses indicating condition, concession, purpose, result,
 etc.): *I may be wrong, but I think you would be wise to go.*
 3. (used to express possibility, opportunity, or per-
 mission): *It may rain. You may enter.* 4. *Archaic.* (used
 to express ability or power.) [OE *mæg*, 1st and 3rd
 pers. sing. pres. ind. of *magan*, C G *mögen*]

—Syn. 3. See can.

may² (mä), n. *Archaic.* a maiden.

May (mä), n. 1. the fifth month of the year, con-
 taining 31 days. 2. the early part of one's life, esp. the
 prime: *a young woman in her May*. 3. the festivities of
 May Day. 4. (l.c.) *Brit.* the hawthorn. 5. Also, **Mae**,
Mai, a girl's given name. —v.i. 6. (l.c.) to gather
 flowers in the spring: *when we were maying*. [ME; OE
Maieus < L, short for *Maieus mēnsis* Maia's month]

May (mä), n. Cape, a cape at the SE tip of New
 Jersey, on Delaware Bay.

may-a (mä/yä, -ya), n. *Hinduism*. 1. the power, as of
 a god, to produce illusions. 2. the production of an
 illusion. 3. (in Vedantic philosophy) the illusion of the
 reality of sensory experience and of the experienced
 qualities and attributes of oneself. 4. (cap.) Also called
Mahamaya, a goddess personifying the power that
 creates phenomena. [C Skt] —**ma/yan**, adj.

May-a (mä/yä), n., pl. -yas, (esp. collectively) -ya.
 1. a member of an Amerindian people of Yucatán who
 had attained a relatively high pre-Columbian civiliza-
 tion. 2. the historical and modern language of the
 Mayas, of Mayan stock.

May-a-güez (mä/yä gwēs/), n. a seaport in W Puerto
 Rico. 50,147 (1960).

May-a-kov-ski (mä/yä kōf/ski), n. **Vla-di-mir Vla-
 di-mi-ro-vich** (vlä dē/mīr vlä dē/mī ro vich), 1893-
 1930, Russian poet. Also, **Ma-ya-kov/sky**.

May-an (mä/yan), adj. 1. of or pertaining to the
 Mayas. —n. 2. a member of the Mayan tribe. 3. a
 linguistic stock of southern Mexico, Guatemala, and
 British Honduras, including Maya and Quiché, and
 probably related to Penutian. [MAY(A) + -AN]

May/ apple, 1. a perennial, American herb, *Pod-
 ophyllum peltatum*, bearing an edible, yellowish, egg-
 shaped fruit. 2. the fruit itself. Also called **Indian apple**.

may-be (mä/bē), adv. perhaps; possibly: *Maybe I'll
 go too.* [late ME *may be*, short for *it may be*]

May-beck (mä/bek), n. Bernard, 1862-1957 U. S.
 architect.

May/ bee-tle. See June bug (def. 1).

May-blob (mä/blob/), n. See marsh marigold.

May/ Day, the first day of May, long celebrated
 with various festivities, as the crowning of the May
 queen, dancing around the Maypole, and, in recent
 years, often marked by labor parades and political
 demonstrations. [late ME] —**May/-day**, adj.

May-day (mä/dä/), n. the international radiotele-
 phone distress signal, used by ships and aircraft. [C
 pseudo-F *m'aidez* help me]

May-ence (ma yän/), n. French name of Mainz.

May-enne (ma yen/), n. a department in W France.
 250,030 (1962); 2012 sq. mi. Cap.: Laval.

May-er (mä/or for 1; mī/or for 2), n. 1. Louis B(ur)t
 (bürt), 1885-1957, U.S. motion-picture producer, born
 in Russia. 2. Maria Goepp-pert (gō/pert), born 1906,
 U.S. physicist, born in Poland; Nobel prize 1963.

may-est (mä/ist), v. *Archaic.* 2nd pers. sing. pres.
 indic. of may.

May-fair (mä/fär/), n. a fashionable locality in
 London, England, E of Hyde Park.

may/fair tan. See sun tan (def. 2). [after MAY-
 FAIR]

May-f
 (1960)

may-f
 -fish.

May-f
 which the N
 blossom
 anemic
 Engla

May/i
 agree-
 ment,
 in the
 Nover

May/
 fly may

may-f
 1. any
 eropter
 branot
 much

may-f
 stage a
 artifici
 [MAX

may-h
 for it r

may-h
 hap.

may-h
 fully ir
 him le
 utes, s
 [ME n
 MHG
 MAIM]

May-l
 [late n

Maym
 Also, M

May-n
 chuset

May-n
 may-n

May-o
 his bro

May-o
 2. a ce
 Repub
 seat: C

May-o
 ipines

may-o
 dressin
 etc. [C
 Minor

may-o
 of a cit
 city or
 ME

may-
 —may

may-o
 the of
 mairalt

may-o
 2. Brit.
 first la
 etc. [M

May/oi
 novel (

May-yo
 in the
 1960);

May-p
 orated
 dance o

[MAY-]
 —may-p

may-p
 flower
 plant i
 maraco

May/
 flowers

May-t
 Day.

Mays
 baseball

mayst
 may.

Mays-
 8484 (1

May-th
 called M

may/t
 May-vi

may-w
 Cotula,
 North
 and flo

May/
 [obs. m
 Mosel
 May-w
 Chicago

maz-ae
 (in cert
 physces
 mäs(a)

maz-al
 maz-ar
 2. Obs.
Maz-a-l
 Jules (C
 French
 minist

maz-a-l
 strainer
 the wa
 MAZAR

Mazar
 N Afgh

descended or derived from; >, whence; b., blend of, blended; c., cognate with;
 deriv., derivative; equiv., equivalent; imit., imitative;
 (ue; r., replacing; s., stem; sp., spelling; trans., translation; ?, origin unknown, perhaps;
 *, hypothetical. See the full key inside the front cover.